

CLAIMS:

We claim:

1. A method of recovering energy that comprises:

5 Providing a multiple circulation path integrated plate fin and tube or finned tube heat exchanger that can be used in heat transfer system that comprises the steps of:

- a. providing a first working fluid circulation path on a finned exterior side of a heat transfer device,
- 10 b. feeding the first working fluid to the circulation path on the exterior finned side of a heat transfer zone to transfer heat to or from the first working fluid thereby heating or cooling the first working fluid to a higher or lower temperature, and feeding a second working fluid into a second interior (tube side) circulation path within a heat exchanger to be heated or cooled by the first working fluid and
- 15 c. providing a third fluid circulation path in the heat exchanger and feeding a third working fluid into the third interior (tube side) circulation path to be heated or cooled by the first working fluid.
- d. interweaving the second and third fluid flow paths of the exchanger to
- 20 achieve more efficient heat transfer characteristics than can be achieved with the same streams arranged in series.

2. The method of claim 1 wherein the first working fluid and the second working fluid have the same composition.

- 25 3. The method of claim 1 where the first working fluid and the second working fluid are of different composition.

4. The method of claim 1 wherein more than two working fluid circulation pathways
- 30 are provided in the interior (tube side) of the exchanger.

5. A method of construction of a heat exchanger that comprises providing a plurality of circulation paths in a plate finned and tube or finned tube exchanger utilizing a plurality of tube side circuits that are interlaced to accomplish more effective heat transfer than would be possible with a plurality of tube side fluid streams arranged in series without interlacing the circuitry.
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6. The method of claim 4 wherein the first working fluid and the second working fluid have the same composition.
7. The method of claim 4 where the tube working fluids are of different composition.
- 10 8. An energy recovery apparatus that comprises: a finned surface heat exchanger comprising a plurality of circulation pathways for a plurality of working fluids, and circulation means to pass a plurality of working fluids into at least one heat exchange zone.
9. The apparatus of claim 8 wherein the apparatus comprises a plurality working fluid streams in circulation pathways of a plate fin and tube or finned tube exchanger.
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10. The apparatus of claim 9 further comprising multiple heat recovery stages to provide additional heat recovery.
11. A method for designing an energy recovery system for increasing the efficiency of a gas turbine exhaust heat recovery by providing an integrated tube side heating circuitry to heat a plurality of working fluid circuits while cooling the exhaust stream of the gas turbine.
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